MACTEC ENVIRONMENTAL RESTORATION SERVICES, LLC

Spectral Gamma-Ray Borehole
Log Data Report

**Log Event** A

**Borehole** # 40-04-07

## Borehole Information

| | | |
|---|---|---|
| **Farm :** S | **Tank :** S-104 | **Site Number :** 299-W23-122 |
| **N-Coord :** 36,087 | **W-Coord :** 75,694 | **TOC Elevation :** 665.51 |
| **Water Level, ft :** | **Date Drilled :** 5/31/1970 | |

### Casing Record

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|---|---|---|
| Type : Steel-welded | Thickness : 0.280 | ID, in. : 6 |
| Top Depth, ft. : 0 | Bottom Depth, ft. : 97 | |

**Borehole Notes:**
This borehole was drilled in May and June 1970 and completed to a depth of 100 ft with 6-in.-diameter casing. The driller's log makes no reference to perforations or grout. Therefore, it is assumed that the borehole was not perforated or grouted. The casing wall thickness is assumed to be 0.280 in., on the basis of the published thickness for schedule-40, 6-in. steel casing.

The driller's log indicates that the borehole was drilled to a depth of 52 ft when the driller "hit something solid." A 6-in. section of "0.5-in. reinforcement steel" was brought to the ground surface. The drilling rig was apparently moved to another location and the borehole was redrilled. The driller's log gives no indication as to the location of the second drill site relative to the first.

The zero depth reference for the SGLS logs is the top of the casing.

## Equipment Information

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|---|---|---|
| **Logging System :** 2 | **Detector Type :** HPGe | **Detector Efficiency:** 35.0 % |
| **Calibration Date :** 05/1996 | **Calibration Reference :** GJPO-HAN-5 | **Logging Procedure :** P-GJPO-1783 |

## Log Run Information

| | | |
|---|---|---|
| **Log Run Number :** 1 | **Log Run Date :** 05/23/1996 | **Logging Engineer:** Bob Spatz |
| **Start Depth, ft.:** 0.0 | **Counting Time, sec.:** 100 | **L/R :** L **Shield :** N |
| **Finish Depth, ft. :** 21.0 | **MSA Interval, ft. :** 0.5 | **Log Speed, ft/min.:** n/a |

| | | |
|---|---|---|
| **Log Run Number :** 2 | **Log Run Date :** 05/24/1996 | **Logging Engineer:** Bob Spatz |
| **Start Depth, ft.:** 97.5 | **Counting Time, sec.:** 100 | **L/R :** L **Shield :** N |
| **Finish Depth, ft. :** 20.0 | **MSA Interval, ft. :** 0.5 | **Log Speed, ft/min.:** n/a |

**Log Event** A

**Borehole** # 40-04-07

## Analysis Information

Analyst : D.L. Parker

Data Processing Reference : P-GJPO-1787 Analysis Date : 03/07/1997

**Analysis Notes :**

The borehole was logged in two log runs with a centralizer used for each log run. The pre- and post-survey field verification spectra for each log run met the acceptance criteria established for peak shape and system efficiency. The energy and peak-shape calibration from the post-survey field verification spectra were used to establish the channel-to-energy parameters used in processing the spectra acquired during log run one. The energy and peak-shape calibration from the pre-survey field verification spectra were used to establish the channel-to-energy parameters used in the processing of the spectra acquired during log run two. Casing correction factors for 0.280-in.-thick casing were applied during the analysis.

Cs-137 was the only man-made radionuclide detected in this borehole. Cs-137 contamination was detected continuously from the ground surface to about 19.5 ft, and intermittently from 20 ft to the bottom of the borehole. A zone of higher, continuous contamination is also found near 52 ft. The maximum Cs-137 concentration was about 7 pCi/g at about 14 ft. Zones of special interest in the Cs-137 plot are shown from depths of about 3 to 19 ft and 50 to 54 ft.

The logs of the naturally occurring radionuclides show an increase in K-40 concentration below a depth of about 46.5 ft and an increase in U-238 concentrations from about 50 to 51 ft. An increase in the KUT concentrations occurs below about 66 ft.

Details concerning the interpretation of data for this borehole are presented in the Tank Summary Data Report for tank S-104.

**Log Plot Notes:**

Separate log plots show the man-made and the naturally occurring radionuclides. The naturally occurring radionuclides can be used for lithology interpretations. The headings of the plots identify the specific gamma rays used to calculate concentrations.

Uncertainty bars on the plots show the statistical uncertainties for the measurements as 95-percent confidence intervals. Open circles on the plots give the minimum detection limit (MDL). The MDL of a radionuclide represents the lowest concentration at which positive identification of a gamma-ray peak is statistically defensible.

A combination plot includes both the man-made and naturally occurring radionuclides, the total-count log plot, as well as the Tank Farm gross-gamma log. The Tank Farm gross-gamma plot displays the latest available digital data. No attempt has been made to adjust the depths of the gross gamma log plot to coincide with the SGLS data.